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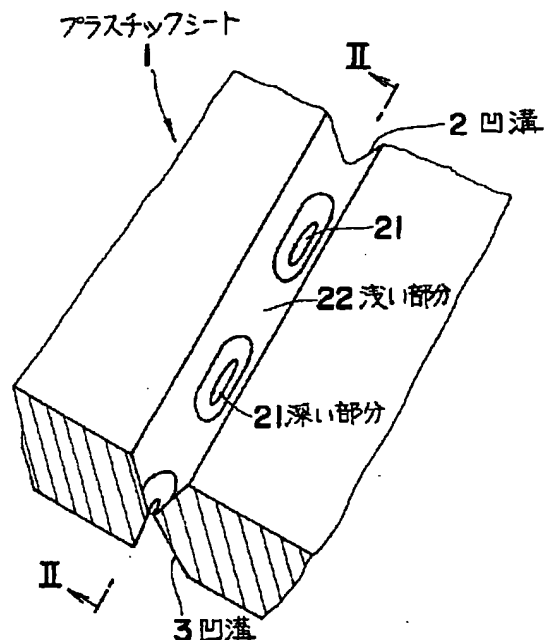
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(54)【発明の名称】 折り曲げ罫線入りプラスチックシート

(57)【要約】

【目的】 プラスチックシートを折り曲げ加工する際の折り曲げ性が良好で、バリの発生もない構造の折り曲げ罫線を提供する。

【構成】 プラスチックシート1の両面から罫線となる凹溝2、3を形成するとともに、少なくとも片面からの凹溝2には、長手方向に深い部分21と浅い部分22とを形成する。



## 【特許請求の範囲】

【請求項1】 プラスチックシートの両面から折り曲げ野線となる凹溝を形成するとともに、少なくとも片面からの凹溝には、長手方向に浅い部分と深い部分とを形成したことを特徴とする折り曲げ野線入りプラスチックシート。

## 【発明の詳細な説明】

【0001】

【産業上の利用分野】 本発明は、折り曲げ野線入りプラスチックシートに関し、詳しくはプラスチックシートを折り曲げ加工する際の折り曲げ部となる野線の構造に関する。

【0002】

【従来の技術】 プラスチックシートを折り曲げ加工して包装容器等に加工する場合は、該シートにあらかじめ折り曲げ用の野線を付設し、この野線に沿って折り曲げ加工するのが普通である。従来の折り曲げ野線入りプラスチックシートは、プラスチックシートの片面から野線を設けるものがほとんどであった。

【0003】 ところが、単に片面から野線を形成しただけでは、折り曲げ時に野線の幅方向の角部が当てられ曲げ難いという問題があった。これを解決するためには、野線幅を広くすることが一番であるが、プラスチックシートに広くて深い野線を設けることは、高圧で野線型を押圧する必要がある、シートの物性によっては、破れるおそれがある。また、幅広に野線を設けると、プラスチックシートが横方向に伸びるため、小型の箱体を製造する場合等は、野線と野線が交わる部分にシワや波打ちが発生してしまう。

【0004】 そこで、本出願人は、折り曲げ線を形成する凹溝の底部に、その長さ方向に沿って凹凸又は断続孔を形成した折り曲げ野線入りプラスチックシートを提案した（実公平4-9345号公報参照）。

【0005】

【発明が解決しようとする課題】 上記構造の野線は、折り曲げ性は良好であるが、プラスチックシートを折り曲げた時に、凹部の端部が割れてバリが発生することがあり、この部分の手ざわりが悪くなったり、布等を包装する場合には、糸がバリに引っ掛かり布を傷めてしまうことがあった。

【0006】 そこで本発明は、折り曲げ性が良好で、バリの発生もない構造の折り曲げ野線を提供することを目的としている。

【0007】

【課題を解決するための手段】 上記した目的を達成するため、本発明の折り曲げ野線入りプラスチックシートは、プラスチックシートの両面から折り曲げ野線となる凹溝を形成するとともに、少なくとも片面からの凹溝には、長手方向に浅い部分と深い部分とを形成したことを特徴としている。

【0008】 以下、本発明を図面に基いて説明する。

図1は本発明の折り曲げ野線の一例を示す拡大斜視図、図2は図1の II-II断面図、図3は図2の III-III断面図、図4は図3に示す部分を折り曲げた状態を示す断面図、図5は図2の V-V断面図、図6は図5に示す部分を折り曲げた状態を示す断面図、図7は本発明の折り曲げ野線の他の例を示す断面図、図8は野線加工装置の一例を示す正面図、図9は同じく側面図である。

【0009】 本発明の折り曲げ野線は、図1及び図2に示すように、プラスチックシート1の両面からそれぞれ凹溝2、3を設けたものであって、少なくとも片面からの凹溝2には、該凹溝2の長手方向に深い部分21と浅い部分22とを設けている。

【0010】 上記プラスチックシート1は、使用目的に応じて各種のものをを用いることができるが、例えば、ポリ塩化ビニル、ポリプロピレン、ポリエチレンテレフタレート等の硬質シートを用いることができ、その厚さとしては、0.1～1.0mm程度が適当である。

【0011】 上記凹溝2、3は、プラスチックシート1の材質や厚さなどにより適宜な寸法で形成されるものであるが、その開口幅は、シート厚さの0.5～3倍程度が好ましく、開口幅が狭いと折り曲げ性が悪化し、開口幅が広いと凹溝形成時の加工性が悪化する。また、凹溝2の深い部分21と浅い部分22の長さは、通常は、それぞれを0.2～2mm程度にすることが好ましい。さらに、前記凹溝2の深い部分21は、他面からの凹溝3側に貫通していてもよく、一方、浅い部分22の深さは、他面からの凹溝3との間に適当な強度の連結部を形成できる程度にすることが必要であり、シート厚さの0.1～0.8倍が好ましく、プラスチックシート1の厚さによっては、その深さを零にしてもよい。

【0012】 このように両面から折り曲げ用の野線となる凹部を設けることにより、図3に示す凹溝2の深い部分21が他面からの凹溝3と貫通した部分は、図4に示すようにいずれの方向にも容易に折り曲げることができ、また、図5に示す凹溝2の浅い部分22は、図6に示すように、極薄い部分が折れ曲がるので、いずれの方向にも容易に折り曲げることができるとともに、バリの発生も防止できる。

【0013】 また、図7に示すように、プラスチックシート1の両面から、深さ0の浅い部分22、32と深い部分21、31とを交互に設けるようにしてもよく、両面の深い部分21、31を長さ方向にずらして形成したり、その長さを変えて形成したり、さらに深さを3段階以上に変えてもよい。

【0014】 図8及び図9は、上記構造の野線を形成する一手段を示すものである。この装置は、上ロール5と下ロール6とからなるもので、上ロール5には、折り曲げ野線の深い部分を形成するための凸部51と浅い部分を形成する凹部52とを交互に設けたギヤー状であって

刃先がV型の回転ロールを用い、下ロール6には、逆V字型又は逆U字型の刃先形状を有する回転ロールを用いている。このような両ロール5、6間にプラスチックシート1を通すことにより、前記図1、図2に示す構造の折り曲げ野線が得られる。両ロール5、6は、加工性を向上させるために加熱してもよく、また、両ロール5、6を共にギヤー形状にすることにより、前記図7に示すような構造の野線も得られる。

【0015】なお、両ロール5、6の凹凸寸法や刃先形状、ロール間のギャップは、加工するプラスチックシート10の肉厚や物性により、適宜最適な状態に設定することはいうまでもない。また、複数の刃先を設けて同時に複数本の野線加工を行うようにすることもできる。

【0016】

【実施例】以下、本発明の実施例を説明する。素材として、厚さ0.3mmのポリプロピレンシートを用い、野線加工は、前記図8及び図9に示した構造のロールを用いて行った。上ロールは、直径70φ、凹凸の差が0.15mm、凹凸間が0.5mm、刃先角度が70度の刃を有するもので、下ロールは、直径70φ、刃先角度70度でV字状の刃を有するものとした。上下ロールの刃先間のギャップは0として、5M/分のスピードで回転させてシートを送り込んだ結果、前記図1、図2に示すような構造の折り曲げ用野線を得た。この折り曲げ用野線は、いずれの方向にも容易に折り曲げることができ、またバリの発生もなく、手ざわりのよいケースが得られ\*

＊た。

【0017】

【発明の効果】以上説明したように、本発明の折り曲げ野線入りプラスチックシートは、プラスチックシートの両面から折り曲げ野線となる凹溝を設けたので、折り曲げ性が向上するとともに、バリが発生しないため、布等を包装しても糸が引っ掛かることがなく、また、手ざわりの良い折り曲げ部を形成することができる。

【図面の簡単な説明】

【図1】 本発明の折り曲げ野線の一例を示す拡大斜視図である。

【図2】 図1のII-II断面図である。

【図3】 図2のIII-III断面図である。

【図4】 図3に示す部分を折り曲げた状態を示す断面図である。

【図5】 図2のV-V断面図である。

【図6】 図5に示す部分を折り曲げた状態を示す断面図である。

【図7】 本発明の折り曲げ野線の他の例を示す断面図である。

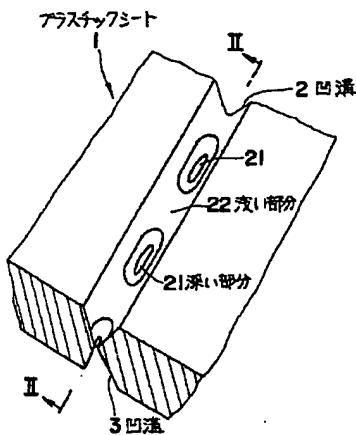
【図8】 野線加工装置の一例を示す正面図である。

【図9】 同じく側面図である。

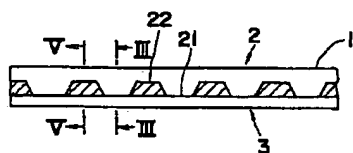
【符号の説明】

1…プラスチックシート 2、3…凹溝 21、31…深い部分 22、32…浅い部分

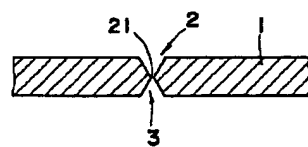
【図1】



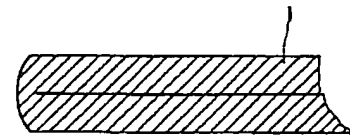
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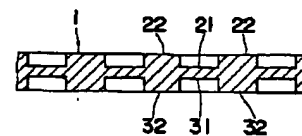
【図3】



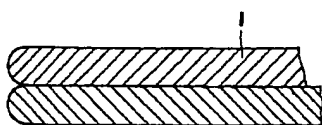
【図6】



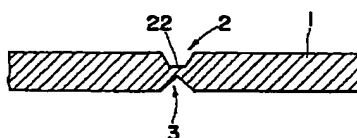
【図7】



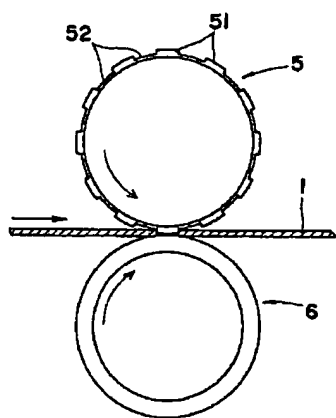
【図4】



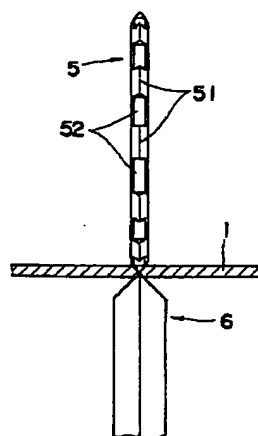
【図5】



【図8】



【図9】



## PATENT ABSTRACTS OF JAPAN

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(71)Applicant : MITSUBISHI PLASTICS IND LTD

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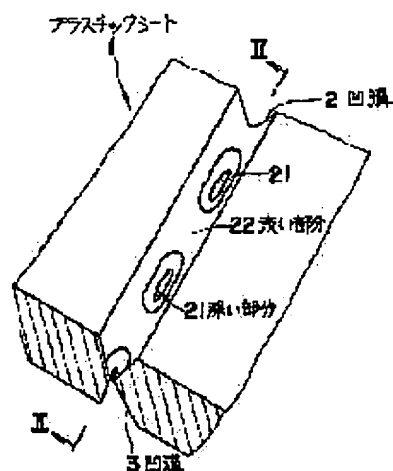
(72)Inventor : HASHIMOTO TADASHI

## (54) PLASTIC SHEET WITH RULED LINE FOR BENDING

## (57)Abstract:

PURPOSE: To provide ruled lines on a plastic sheet, by which the plastic sheet can be well bent and also no burr arises.

CONSTITUTION: Recessed grooves 2, 3 are formed from both faces of a plastic sheet 1 to make ruled lines. Deeper parts 21 and shallower parts 22 are defined in the longitudinal direction in at least one of the recessed groove 2.



## LEGAL STATUS

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07.04.1999

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3172891

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30.03.2001

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CLAIMS

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[Claim(s)]

[Claim 1] The sheet plastic containing a bending ruled line characterized by forming a shallow part and a deep part from at least one side at a longitudinal direction at a concave while forming the concave which bends from both sides of a sheet plastic and serves as a ruled line.

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[Translation done.]

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the structure of the ruled line used as the bending section at the time of bending and processing a sheet plastic in detail about the sheet plastic containing a bending ruled line.

[0002]

[Description of the Prior Art] When bending and processing a sheet plastic and processing it into a container etc., the ruled line for bending is beforehand attached to this sheet, and, usually it is bent and processed along with this ruled line. That in which the conventional sheet plastic containing a bending ruled line forms a ruled line from one side of a sheet plastic was almost the case.

[0003] However, there was a problem of hitting and being hard to bend the corner of the cross direction of a ruled line at the time of bending, only by forming a ruled line from one side.

Although it is best to make ruled line width of face large in order to solve this, forming a large and deep ruled line in a sheet plastic needs to press a ruled line mold with high pressure, and it has a possibility that it may be torn depending on the physical properties of a sheet. Moreover, when manufacturing a small box since a sheet plastic is extended in a longitudinal direction if a ruled line is formed broadly, Siwa and flapping will occur into the part which a ruled line and a ruled line cross.

[0004] Then, these people proposed the sheet plastic containing a bending ruled line which formed irregularity or an intermittence hole in the pars basilaris ossis occipitalis of the concave which forms a bend line along the die-length direction (refer to JP,4-9345,Y).

[0005]

[Problem(s) to be Solved by the Invention] Although bending nature was good, yarn might be caught in weld flash and the ruled line of the above-mentioned structure might damage cloth, when a sheet plastic was bent, and the edge of a crevice might break, weld flash might occur, and the feel of this part worsened or packed cloth etc.

[0006] Then, bending nature of this invention is good and it aims at offering the bending ruled line of the structure which generating of weld flash does not have, either.

[0007]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the sheet plastic containing a bending ruled line of this invention is characterized by forming a shallow part and a deep part at a longitudinal direction from at least one side at the concave while forming the concave which bends from both sides of a sheet plastic and serves as a ruled line.

[0008] Hereafter, this invention is explained based on a drawing. The expansion perspective view in which drawing 1 shows an example of the bending ruled line of this invention, and drawing 2 are drawing 1 . II-II sectional view, Drawing 3 is drawing 2 . An III-III sectional view, the sectional view showing the condition that drawing 4 bent the part shown in drawing 3 , Drawing 5 is drawing 2 . Similarly a V-V sectional view, the sectional view showing the condition that drawing 6 bent the part shown in drawing 5 , the sectional view in which drawing 7 shows other examples of the bending ruled line of this invention, the front view in which drawing 8 shows an example of

ruled line processing equipment, and drawing 9 are side elevations.

[0009] As shown in drawing 1 and drawing 2, the bending ruled line of this invention formed concaves 2 and 3 from both sides of a sheet plastic 1, respectively, and provides the deep part 21 and the shallow part 22 in the concave 2 from at least one side at the longitudinal direction of this concave 2.

[0010] Although various kinds of things can be used for the above-mentioned sheet plastic 1 according to the purpose of use, hard sheets, such as a polyvinyl chloride, polypropylene, and polyethylene terephthalate, can be used for it, for example, and about 0.1-1.0mm is suitable for it as the thickness.

[0011] Although the above-mentioned concaves 2 and 3 are formed with a proper dimension of the quality of the material, thickness, etc. of a sheet plastic 1, if the aperture width has about 0.5 to 3 desirable times of sheet thickness and its aperture width is narrow, it will be bent, a sex gets worse, and if aperture width is wide, the workability at the time of concave formation will get worse. Moreover, as for the die length of the deep part 21 of a concave 2, and the shallow part 22, it is usually desirable to set each to about 0.2-2mm. furthermore, the deep part 21 of said concave 2 — on the other hand — since — a concave 3 side — penetrating — \*\*\*\* — the depth of the part 22 shallow on the other hand — on the other hand — since — making it extent which can form the connection section of reinforcement suitable between concaves 3 — required — 0.1 to 0.8 times of sheet thickness — desirable — the thickness of a sheet plastic 1 — the depth — zero — even if — it is good.

[0012] thus, the deep part 21 of a concave 2 shown in drawing 3 by preparing the crevice which bends from both sides and serves as a ruled line of business — on the other hand — since — the shallow part 22 of a concave 2 which can bend a concave 3 and the penetrated part easily in any direction as shown in drawing 4, and is shown in drawing 5 is shown in drawing 6 — as — a pole — since a thin part bends, while it is easily bendable in any direction, generating of weld flash can also prevent.

[0013] Moreover, as shown in drawing 7, from both sides of a sheet plastic 1, it may be made to form the shallow parts 22 and 32 of the depth 0, and the deep parts 21 and 31 by turns, and the double-sided deep parts 21 and 31 may be shifted and formed in the die-length direction, the die length may be changed and formed, or the depth may be further changed more than a three-stage.

[0014] Drawing 8 and drawing 9 show a way stage which forms the ruled line of the above-mentioned structure. This equipment consists of an upper roll 5 and a bottom roll 6, it has the shape of gear which formed by turns the heights 51 for forming the deep part of a bending ruled line in the upper roll 5, and the crevice 52 which forms a shallow part, and the edge of a blade uses for the bottom roll 6 the roll kneader which has the edge-of-a-blade configuration of a reverse V character mold or an inverted-U character mold using the roll kneader of a V type. The bending ruled line of the structure shown in said drawing 1 and drawing 2 is obtained by letting a sheet plastic 1 pass between such both rolls 5 and 6. The ruled line of structure as shown in said drawing 7 is also obtained by heating, in order that both the rolls 5 and 6 may raise workability, and making both the rolls 5 and 6 of both into a gear configuration.

[0015] In addition, it cannot be overemphasized that the concavo-convex dimension of both the rolls 5 and 6, an edge-of-a-blade configuration, and the gap during a roll are suitably set as the optimal condition by the thickness and the physical properties of the sheet plastic to process. Moreover, two or more edge of a blade is prepared, and two or more ruled line processing can be performed to coincidence.

[0016]

[Example] Hereafter, the example of this invention is explained. Ruled line processing was performed using the roll of the structure shown in said drawing 8 and drawing 9, using a polypropylene sheet with a thickness of 0.3mm as a material. In an upper roll, between 0.15mm and irregularity shall have the cutting edge whose difference of diameter 70phi and irregularity is 70 degrees, and, as for a bottom roll, whenever [ 0.5mm and tool angle ] shall have a V character-like cutting edge at 70 degrees whenever [ diameter 70phi and tool angle ]. The gap of cutting-edge Sakima of a vertical roll obtained the ruled line for bending of structure as shown in



said drawing 1 and drawing 2 , as a result of making it rotate at five M speed for /and sending in a sheet as 0. This ruled line for bending can be easily bent in any direction, and does not have generating of weld flash, either, and the good case of a feel was acquired.

[0017]

[Effect of the Invention] As explained above, since the concave which bends from both sides of a sheet plastic and serves as a ruled line was prepared and weld flash does not occur while bending nature improves, even if the sheet plastic containing a bending ruled line of this invention packs cloth etc., yarn is not caught and it can form the good bending section of a feel.

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[Translation done.]

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**TECHNICAL FIELD**

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[Industrial Application] This invention relates to the structure of the ruled line used as the bending section at the time of bending and processing a sheet plastic in detail about the sheet plastic containing a bending ruled line.

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[Translation done.]

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**PRIOR ART**

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[Description of the Prior Art] When bending and processing a sheet plastic and processing it into a container etc., the ruled line for bending is beforehand attached to this sheet, and, usually it is bent and processed along with this ruled line. That in which the conventional sheet plastic containing a bending ruled line forms a ruled line from one side of a sheet plastic was almost the case.

[0003] However, there was a problem of hitting and being hard to bend the corner of the cross direction of a ruled line at the time of bending, only by forming a ruled line from one side.

Although it is best to make ruled line width of face large in order to solve this, forming a large and deep ruled line in a sheet plastic needs to press a ruled line mold with high pressure, and it has a possibility that it may be torn depending on the physical properties of a sheet. Moreover, when manufacturing a small box since a sheet plastic is extended in a longitudinal direction if a ruled line is formed broadly, Siwa and flapping will occur into the part which a ruled line and a ruled line cross.

[0004] Then, these people proposed the sheet plastic containing a bending ruled line which formed irregularity or an intermittence hole in the pars basilaris ossis occipitalis of the concave which forms a bend line along the die-length direction (refer to JP,4-9345,Y).

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[Translation done.]

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## EFFECT OF THE INVENTION

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[Effect of the Invention] As explained above, since the concave which bends from both sides of a sheet plastic and serves as a ruled line was prepared and weld flash does not occur while bending nature improves, even if the sheet plastic containing a bending ruled line of this invention packs cloth etc., yarn is not caught and it can form the good bending section of a feel.

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[Translation done.]

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**TECHNICAL PROBLEM**

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[Problem(s) to be Solved by the Invention] Although bending nature was good, yarn might be caught in weld flash and the ruled line of the above-mentioned structure might damage cloth, when a sheet plastic was bent, and the edge of a crevice might break, weld flash might occur, and the feel of this part worsened or packed cloth etc.

[0006] Then, bending nature of this invention is good and it aims at offering the bending ruled line of the structure which generating of weld flash does not have, either.

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[Translation done.]

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MEANS

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[Means for Solving the Problem] In order to attain the above-mentioned purpose, the sheet plastic containing a bending ruled line of this invention is characterized by forming a shallow part and a deep part at a longitudinal direction from at least one side at the concave while forming the concave which bends from both sides of a sheet plastic and serves as a ruled line.

[0008] Hereafter, this invention is explained based on a drawing. The expansion perspective view in which drawing 1 shows an example of the bending ruled line of this invention, and drawing 2 are drawing 1. II-II sectional view, Drawing 3 is drawing 2. An III-III sectional view, the sectional view showing the condition that drawing 4 bent the part shown in drawing 3, Drawing 5 is drawing 2. Similarly a V-V sectional view, the sectional view showing the condition that drawing 6 bent the part shown in drawing 5, the sectional view in which drawing 7 shows other examples of the bending ruled line of this invention, the front view in which drawing 8 shows an example of ruled line processing equipment, and drawing 9 are side elevations.

[0009] As shown in drawing 1 and drawing 2, the bending ruled line of this invention formed concaves 2 and 3 from both sides of a sheet plastic 1, respectively, and provides the deep part 21 and the shallow part 22 in the concave 2 from at least one side at the longitudinal direction of this concave 2.

[0010] Although various kinds of things can be used for the above-mentioned sheet plastic 1 according to the purpose of use, hard sheets, such as a polyvinyl chloride, polypropylene, and polyethylene terephthalate, can be used for it, for example, and about 0.1-1.0mm is suitable for it as the thickness.

[0011] Although the above-mentioned concaves 2 and 3 are formed with a proper dimension of the quality of the material, thickness, etc. of a sheet plastic 1, if the aperture width has about 0.5 to 3 desirable times of sheet thickness and its aperture width is narrow, it will be bent, a sex gets worse, and if aperture width is wide, the workability at the time of concave formation will get worse. Moreover, as for the die length of the deep part 21 of a concave 2, and the shallow part 22, it is usually desirable to set each to about 0.2-2mm. furthermore, the deep part 21 of said concave 2 -- on the other hand -- since -- a concave 3 side -- penetrating -- \*\*\*\* -- the depth of the part 22 shallow on the other hand -- on the other hand -- since -- making it extent which can form the connection section of reinforcement suitable between concaves 3 -- required -- 0.1 to 0.8 times of sheet thickness -- desirable -- the thickness of a sheet plastic 1 -- the depth -- zero -- even if -- it is good.

[0012] thus, the deep part 21 of a concave 2 shown in drawing 3 by preparing the crevice which bends from both sides and serves as a ruled line of business -- on the other hand -- since -- the shallow part 22 of a concave 2 which can bend a concave 3 and the penetrated part easily in any direction as shown in drawing 4, and is shown in drawing 5 is shown in drawing 6 -- as -- a pole -- since a thin part bends, while it is easily bendable in any direction, generating of weld flash can also prevent.

[0013] Moreover, as shown in drawing 7, from both sides of a sheet plastic 1, it may be made to form the shallow parts 22 and 32 of the depth 0, and the deep parts 21 and 31 by turns, and the double-sided deep parts 21 and 31 may be shifted and formed in the die-length direction, the die length may be changed and formed, or the depth may be further changed more than a three-

stage.

[0014] Drawing 8 and drawing 9 show a way stage which forms the ruled line of the above-mentioned structure. This equipment consists of an upper roll 5 and a bottom roll 6, it has the shape of gear which formed by turns the heights 51 for forming the deep part of a bending ruled line in the upper roll 5, and the crevice 52 which forms a shallow part, and the edge of a blade uses for the bottom roll 6 the roll kneader which has the edge-of-a-blade configuration of a reverse V character mold or an inverted-U character mold using the roll kneader of a V type. The bending ruled line of the structure shown in said drawing 1 and drawing 2 is obtained by letting a sheet plastic 1 pass between such both rolls 5 and 6. The ruled line of structure as shown in said drawing 7 is also obtained by heating, in order that both the rolls 5 and 6 may raise workability, and making both the rolls 5 and 6 of both into a gear configuration.

[0015] In addition, it cannot be overemphasized that the concavo-convex dimension of both the rolls 5 and 6, an edge-of-a-blade configuration, and the gap during a roll are suitably set as the optimal condition by the thickness and the physical properties of the sheet plastic to process. Moreover, two or more edge of a blade is prepared, and two or more ruled line processing can be performed to coincidence.

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[Translation done.]

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EXAMPLE

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[Example] Hereafter, the example of this invention is explained. Ruled line processing was performed using the roll of the structure shown in said drawing 8 and drawing 9 , using a polypropylene sheet with a thickness of 0.3mm as a material. In an upper roll, between 0.15mm and irregularity shall have the cutting edge whose difference of diameter 70phi and irregularity is 70 degrees, and, as for a bottom roll, whenever [ 0.5mm and tool angle ] shall have a V character-like cutting edge at 70 degrees whenever [ diameter 70phi and tool angle ]. The gap of cutting-edge Sakima of a vertical roll obtained the ruled line for bending of structure as shown in said drawing 1 and drawing 2 , as a result of making it rotate at five M speed for /and sending in a sheet as 0. This ruled line for bending can be easily bent in any direction, and does not have generating of weld flash, either, and the good case of a feel was acquired.

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[Translation done.]



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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the expansion perspective view showing an example of the bending ruled line of this invention.

[Drawing 2] Drawing 1 It is an II-II sectional view.

[Drawing 3] Drawing 2 It is an III-III sectional view.

[Drawing 4] It is the sectional view showing the condition of having bent the part shown in drawing 3 .

[Drawing 5] Drawing 2 It is a V-V sectional view.

[Drawing 6] It is the sectional view showing the condition of having bent the part shown in drawing 5 .

[Drawing 7] It is the sectional view showing other examples of the bending ruled line of this invention.

[Drawing 8] It is the front view showing an example of ruled line processing equipment.

[Drawing 9] Similarly it is a side elevation.

[Description of Notations]

1 — Sheet plastic 2 Three — Concave 21 31 — Deep part 22 32 — Shallow part

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[Translation done.]